CARNIVOROUS PLANT NEWSLETTER

Journal of the International Carnivorous Plant Society

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Front Cover: *Sarracenia* 'Adrian Slack', see article on page 116. Photograph by Bob Hanrahan.

Back Cover: Adrian Slack, see article on page 109. Photo by Martin Cheek.

Carnivorous Plant Newsletter is dedicated to spreading knowledge and news related to carnivorous plants. Reader contributions are essential for this mission to be successful. Do not hesitate to contact the editors with information about your plants, conservation projects, field trips, or noteworthy events. Contributors should review the "Instructions to Authors" printed in the March issue of each year. Advertisers should contact the editors. Views expressed in this publication are those of the authors, not the editorial staff.

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Editorial: Milestones

This issue marks three important milestones.

First, this will be the last issue of Carnivorous Plant Newsletter that will be printed while one of the founders of the ICPS is still active in the organization's leadership. After helping lead the ICPS for 29 years, Joe Mazrimas is stepping down from the board of directors. The ICPS owes its existence to the special mutualism that Joe and Don Schnell fostered nearly three decades ago.

Second, Tom Johnson is no longer going to be working as seed bank director and back issue manager. He has performed these jobs for several years, and every board member of the ICPS extends a hearty thank-you to Tom for his work. To take his place, John Brittnacher (a new board member) is assuming the role of seed bank director. His contact information is printed along with the seed bank listing in this issue. Seed bank managers of other organizations take note! John would like to set up exchange programs with you. The back issue orders will be processed by our new board member Cindy Slezak.

Third, I am immensely proud and pleased to announce that this issue of Carnivorous Plant Newsletter is in honor and recognition of that great British horticulturist, Adrian Slack. Through his two books, a gregarious personality, and countless interviews with the media, Adrian Slack greatly influenced the history of carnivorous plant horticulture. Most of the items in this issue feature material related to Adrian Slack, and I hope you enjoy them. Furthermore, Adrian Slack has been awarded an honorary life membership to the ICPS, and a framed, enlarged print of the spectacular *Sarracenia* 'Adrian Slack' has been given to him as a token of affection from the ICPS officers and membership. Thank you, Mr. Slack, for your work! (BMR)

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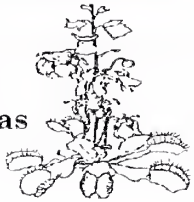

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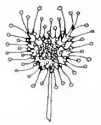
Savage Garden: Slack-Potting the Dewy Pine



Peter D'Amato • California Carnivores • 7020 Trenton-Healdsburg Road • Forestville, CA 95436 • USA

Keywords: cultivation: *Drosophyllum lusitanicum*.

Over twenty years ago, British nurseryman Adrian Slack originated a rather clever way to successfully grow the often temperamental dewy pine (*Drosophyllum lusitanicum*). Glaringly omitted from my own book, The Savage Garden, I wish to correct that oversight here, for this method, called "Slack-potting"—a term coined by Barry Meyers-Rice—is an ingenious method of cultivating *Drosophyllum* with long-term ease.

We must remember that dewy pines are not wetland plants like most other carnivores. Instead, they are typically found on sandy, gravel slopes that are dry most of the year, and usually alkaline in pH. The plant is found in widely scattered sites in Portugal, Spain, and Morocco. The climate is warm-temperate and Mediterranean, which means that most of the rainfall occurs in the cool winter months, with very rare frosts. Summers are warm and dry, but plants near the coast can experience early morning fog drip, which may be absorbed by their leaves.

Seed is usually the only way to propagate *Drosophyllum* (but see CPN 17:4 p106—ed.), and since plants despise root and stem disturbance they are never sold through the mails. Seed is usually produced in late spring or early summer and can germinate readily if very fresh. Older seed benefits from several methods of pretreatment. You can scarify the hard seed coating by rubbing the black, egg-shaped seeds with sandpaper until the whitish interior becomes slightly visible. You can also soak the seed for a day or two in a cup of water in which you have added a tiny bit of powdered gibberellic acid—about 0.5 cm (1/8 inch) collected on the tip of a toothpick works well. I have also scarified the seed and then soaked them in a solution of one-drop Superthrive™ per cup of water.

Slack warns against moving freshly germinated seedlings about, and prefers to sow a few seed directly in their permanent pots, allowing only one plant to grow by removing any others that germinate. This can be a hassle and waste of seed if you have more than just a few to sow, but Slack's warning is legitimate since the first tiny root to appear from a seed will rapidly plunge into the soil medium and can be killed if disturbed. I prefer to sow numerous seed on damp vermiculite (they will germinate on any damp substance, even a sponge) and I check them daily after a week or two. When I see the first white root appear on a seed, I immediately and gently remove it via forceps and set it upon the surface of its permanent pot.

Now this is where the Slack-potting begins. Take a 10-15 cm (4-6 inch) pot made of unglazed terra-cotta clay. Place a wad of damp, long-fibered sphagnum moss through its drainage hole, totally blocking it. As a soil medium, I use one part each perlite, vermiculite, and horticultural sand. Slack includes a portion of John Innes Compost #2 (a humus-based house plant soil), but I find this component to be unnecessary. (It is only available in Britain.) Dampen the mix with purified water and fill the clay pot firmly with it to the brim. Gently place your germinated seed on the center surface of this, one seedling per pot. Place the pot in a shallow water tray in a sunny place with good air circulation, keeping the soil damp to wet for several weeks as the plant establishes itself.

Let the baby plant grow for several weeks, as Slack recommends, before proceeding with phase two. The plant will grow rapidly and when it has several leaves

you are ready to Slack-pot it.

You will need another pot (with drainage holes) at least two inches larger than the pot containing the plant. Slack recommends another clay pot, but in hot, dry climates like California, I use plastic. Block the drainage holes with long-fibered sphagnum. Fill the pot with the perlite-vermiculite-sand medium only as deep as to allow the smaller potted plant to sit comfortably on the medium and have its rim at the same level (or just slightly above) as the larger pot. In the gap between the two pots, tightly pack long-fibered sphagnum.

The whole reason for this elaborate double-potting is to keep the soil around the stem and upper roots on the dry side, or just barely damp, since the prostrate stems tend to rot if left on permanently wet soils. Initially you can keep the whole double pot in a shallow tray of water as well as gently watering the plant itself, keeping the soil damp. But in a very few months the roots of your dewy pine will enter the soil of the larger pot through the sphagnum-crocked hole of the smaller. You can then water the plant via the sphagnum-moat that separates the two pots. Alternatively, you can set the Slack-potted plant in a shallow water tray, and add just enough water to keep the sphagnum-moat damp. Just enough water will permeate the inner clay pot to keep your dewy pine happy, and the deepest roots will find plenty of moisture in the medium of the larger container. This probably recreates the natural situation well, for in the wild dewy pines have roots that are extensive, obtaining moisture from deep underground. Some also believe the plants absorb moisture in summer from condensing early morning fog, but misting the plant is not required.

Slack-potting a dewy pine works best for greenhouse cultivation, particularly in humid climates with long, cool winters, such as Slack's own England. It is not quite as necessary if you live in a Mediterranean climate similar to the dewy pine's. I have seen photographs of huge *Drosophyllum* plants grown in giant clay pots outdoors in Australia. Geoff Wong's prize winning plant photographed in The Savage Garden was a judiciously watered specimen grown in a plastic pot of primarily perlite and a tiny bit of peat, then placed in that lovely glazed ceramic ornamental. I myself grew one outdoors on my deck in northern California, using a plain clay pot. The plant survived months of winter rain, a hard freeze, and baking summer heat (see my 1995 column, "How to Torture a Carnivorous Plant", CPN 24:4, p99.). So while not for everyone, Slack-potting is ideal for many growers. At my nursery just this past week we Slack-potted several dewy pines. In my imagination, I visualized Adrian visiting us in his white suit and Panama hat, nodding his approval as we shared a glass of wine.

Looking Back: CPN 25 years ago

Dave Kutt wrote about how *Aldrovanda*, often considered fragile in cultivation, is apparently quite durable when it comes to freezing! He discovered this during a mishap that occurred during his plants' winter dormancy: "After six weeks at 38°F, the refrigeration equipment malfunctioned and exposed the jar of living *Sphagnum*, water, and turions to below freezing temperatures somewhere around 25°F. The water became a solid block of ice with turions inside. The mass was maintained in this frozen state for five months and after thawing, no harm had been done to the turions whatsoever!"

Lowrie, A. 1999, A Taxonomic Revision of the Yellow Flowered Tuberous Species of *Drosera* (Droseraceae) from South-Western Australia, Nuytsia, 13: 75-87.

Drosera moorei, formerly considered a variety or subspecies of *D. subhirtella*, is established as a distinct species. *D. intricata* is reinstated as a distinct species, and *D. zigzagia* is the name of a still further segregate from *D. subhirtella*, described in the present paper as a new species. All entities are compared with each other in a table, a key is given, and the taxa not yet featured in the author's famous book series "Carnivorous Plants of Australia" are depicted in line drawings. In addition, *D. sulphurea*, formerly included in *D. neesii* subsp. *neesii*, is reinstated at specific rank, so *D. neesii* becomes a taxon exclusively composed of pink-flowered (occasionally white-flowered?) populations (comprising the pink specimens of subsp. *neesii*, the existence of which has been neglected previously, and the always pink-flowered subsp. *borealis*). Further studies will have to establish if specific rank is justified for all the taxa dealt with, but the collection and comparison of data presented in this article is certainly a useful contribution to the taxonomy of *Drosera*. (JS)

Reut, M.S. & Fineran, B.A. 1999, An Evaluation of the Taxonomy of *Utricularia dichotoma* Labill., *U. monanthos* Hook.f., and *U. novae-zelandiae* Hook.f. (Lentibulariaceae), New Zeal. J. Bot., 37: 243-255.

Comparison of herbarium material and of data acquired by field work throughout New Zealand revealed considerable variability and similarity of characters among material described under the three names mentioned in the title. As a consequence, all three taxa are united under the oldest name, *U. dichotoma*. Possible consequences for the status of the recent Australian split-offs, *viz. U. beaugleholei* and *U. paulinae*, are unfortunately not considered. (JS)

Zamudio, S. 1999, Notas sobre la identitad de *Pinguicula moranensis* H.B.K. con la descripcion de una variedad nueva, Acta Bot. Mex., 49: 23-34.

The most widespread (and most variable) Mexican *Pinguicula* species is circumscribed more strictly on the basis of the type specimen. According to the similarity to recent collections and the itinerary of Humboldt and Bonpland, who collected and described the type material, the type is inferred to be from calcareous rocks at "El Puente del Dios" in the vicinity of Real del Monte in Hidalgo, Mexico, although the type locality is stated to be near "Moran" both in the protologue and on the labels of the type specimens. According to the present author, the population of *P. moranensis* from igneous rocks in the vicinity of the old mine of Moran in Hidalgo, Mexico (described as *P. moranensis* var. *neovolcanica*), differs significantly from the type specimens of *P. moranensis*. It is, in the author's opinion, the same plant that has been confused with *P. orchidioides* by J.D. Hooker (the real *P. orchidioides* described by A. Decandolle is a different species characterized by long conspicuous stolons). (JS)

Cultivars Developed by Adrian Slack

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Jan Schlauer • Zwischenstr. 11 • 60594 Frankfurt/Main • Germany

Keywords: cultivars: *Drosera* 'Marston Dragon', *Sarracenia* 'Lynda Butt' — recollections: Adrian Slack.

In this issue dedicated to Adrian Slack, we thought it would be useful to note those cultivars which Slack had a direct role in naming. The data are presented in two lists. The first list includes the names and publication locations for Slack's many established cultivars. After the cultivar name, the title of the relevant book and page reference appear (IP=Insect-Eating Plants and How to Grow Them, CP=Carnivorous Plants). Finally, the ancestry of the cultivar is given (if known). The second list includes plants that are missing photographic standards. The cultivar names in this second list are acceptable but not registered yet. Photographs of them and a permission to reproduce these for the purposes of the ICPS would be appreciated! The photographs of *Drosera* 'Marston Dragon' (Figure 1), and *Sarracenia* 'Lynda Butt' (Figure 2) are the first to be published, and are to be used as the cultivar standards.

For a more complete listing of data regarding these and all the other carnivorous plant cultivars, refer to the International Register of Cultivated Carnivorous Plants, maintained by the ICPS Registrar Jan Schlauer, and kept online (along with his larger carnivorous plant taxonomic database) at http://www.labs.agilent.com/bot/cp_home.

List I: Established cultivar epithets
Drosera 'Marston Dragon', IP:51, *D. binata*
Nepenthes 'Cantley's Red', IP:144, *N. ampullaria*
Pinguicula 'George Sargent', IP:113, *P. moranensis* × *P. gypsicola*
Pinguicula 'Huahuapan', IP:110, *P. moranensis*
Pinguicula 'Weser', IP:113, *P. moranensis* × *P. ehlersiae*
Sarracenia 'Burgundy', IP:71, *S. flava* var. *rubricorpora*
Sarracenia 'Copper Lid', IP:71, *S. flava* var. *cuprea*
Sarracenia 'Daniel Rudd', IP:85, *S. leucophylla* × (*S. leucophylla* × (*S. flava* × *S. purpurea*))
Sarracenia 'Heavily Veined', IP:71, *S. flava* var. *ornata*
Sarracenia 'Judy', IP:78, *S. minor* × (*S. leucophylla* × *S. minor*)
Sarracenia 'Lochness', IP:84, *S. leucophylla* × *S. minor*
Sarracenia 'Lynda Butt', IP:85, ancestry unknown

List II: Unestablished cultivar epithets (lacking standard photograph)
Nepenthes 'Elegance', IP:151, *N. rafflesiana*
Pinguicula 'Hameln', IP:113, *P. gypsicola* × *P. moranensis*
Pinguicula 'Mitla', IP:113, *P. moranensis* × *P. gypsicola*
Pinguicula 'Mitla' IP:110, incorrect reference to *P. moranensis* clone
Pinguicula 'Sethos', IP:113, *P. ehlersiae* × *P. moranensis*
Pinguicula 'Tina', IP:113, P. *agnata* × *P. zecheri*
Pinguicula 'Vera Cruz', IP:110, *P. moranensis*
Sarracenia 'Claret', IP:71, *S. flava* var. *atropurpurea*
Sarracenia 'Evendine', CP:176, *S. leucophylla* × (*S. flava* × *S. purpurea*)
Sarracenia 'Marston Clone', IP:81, *S. flava* var. *maxima* × *S. leucophylla*
Sarracenia 'Marston Dwarf', IP:72, *S. flava* var. *ornata*
Sarracenia 'Marston Mill', CP:175, (*S. leucophylla* × (*S. flava* x *S. purpurea*)) × *S. flava*

Note: There are no descriptions available for the cultivar names *Sarracenia* 'Marston Mill' (probably lost to cultivation) or *Nepenthes* 'Elegance'.

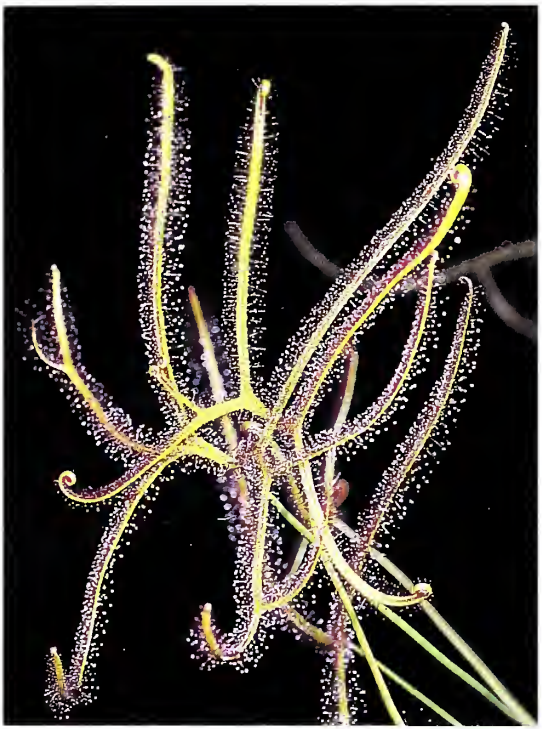

Figure 1: *Drosera* 'Marston Dragon', photograph by Barry Meyers-Rice

Figure 2: *Sarracenia* 'Lynda Butt', photograph by Barry Meyers-Rice

International Carnivorous Plant Society Seed Bank

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D. dielsiana
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D. glanduligera
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D. macrantha subsp. *macrantha*—pink flower
D. rotundifolia—northern California
D. spatulata
D. spatulata—Queensland
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D. stolonifera subsp. *rupicola*
D. stolonifera subsp. *stolonifera*
Nepenthes rafflesiana
N. stenophylla
N. ventricosa × ?
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We reserve the right to limit the quantity of seed available to each member at 1 packet of each variety per month. Please list alternative seed selections, as other orders will arrive before yours. If you have an e-mail address, please include it so we can correspond should any issues arise.

The money raised by the seed bank is used by the ICPS to pay for seed bank expenses, web site ISP charges, and ICPS educational and conservation programs. Donate seed and get credit for free seed from the seed bank.

News & Views

David Gray (3975 B 17th St., San Francisco, CA 94114-2029, davidogray@aol.com) wrote that he visited a *Darlingtonia* site in Tillamook County, Oregon, and found many plants producing seed, some of which he collected for the ICPS seed bank: "My collection of seed was very timely as there was a large-scale logging operation for the old growth cedar on the site, and they had almost reached the small area of sphagnum bog that had the remaining *Darlingtonia*. The logging left total devastation in its wake; two-thirds of the *Darlingtonia* areas had been obliterated. This may be the end of that habitat and this unique population, which is over 120 km north of Florence as the crow flies; Florence with the famous *Darlingtonia* Botanical Wayside/Botanical Garden, is the usually mentioned northern edge of the range."

Drosera slackii – A Living Jewel from South Africa

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Keywords: observations: *Drosera slackii*.
Received: 14 August 2000

Drosera slackii is an attractive evergreen rosetted sundew endemic to the Cape Region of South Africa. It was named in honour of the well known carnivorous plant grower, and author, Adrian Slack (Cheek, 1987).

This sundew forms a flat rosette up to 8 cm across which over time forms a very short stem. There are two distinctive features of this species' leaves: their pandurate (guitar body) shape and the few coarse appressed red hairs on their undersurfaces. The leaf shape is due to the development of two flared edges to the base of the otherwise narrowly wedge-shaped leaves. Each spring mature plants produce one scape, or rarely two, which rise to 40 cm tall (Figure 1). The scapes have a strongly down-curved base and a dense cover of red short-stalked glands. The dark-pink petalled flowers are up to 2.5 cm across and have contrasting white stamens.

The cytology of this species has been found to be 2n=40, which is equal to that of other *Drosera* species from the region, namely: *D. admirabilis, D. venusta, D. capensis* and some forms of *D. aliciae* (Bennett & Cheek, 1990; Rothfels and Hermburger, 1968).

The natural habitat of this sundew is the small peaty wetlands of the Kleinriviersberg Mountains and the southern Kogelberg, between 70 and 100 km south-east of Cape Town. In the Kleinriviersberge this species is known from the boggy beginnings of at least two streams, and includes the type location. In this area it grows in the company of *D. admirabilis, D. aliciae, D. capensis, D.* × *corinthiaca* (=*D. aliciae* × *D. glabripes*), *Utricularia bisquamata*, and the sticky-leaved *Roridula gorgonias*. In the southern Kogelberg this species has been collected in the Palmiet River catchment and has narrower leaves than those of populations to the east. In both areas the plants grow in locations which receive precipitation throughout the year thanks to the not infrequent summer mists. These areas also experience periodic fires, which remove the above-ground growth of this sundew, but it readily resprouts from the roots.

Drosera slackii is an easy plant in cultivation, preferring a peat-based mix, a deep pot, water year-round, and plenty of sun. Whilst not experiencing frost in its natural habitat it is mildly frost tolerant and will resprout from the roots if the rosette is damaged. It is easily propagated by leaf cuttings, root cuttings and, when available, seed.

In conclusion, *Drosera slackii* is a distinctive and attractive South African sundew named after one of the key figures in raising the awareness and delight in growing carnivorous plants worldwide. It is a living jewel, which is appropriately named in honour of Adrian Slack.

Figure 1: *Drosera slackii* flowering in the wild.

Acknowledgment

I wish to thank Eric Green for his hospitality during my visits to South Africa, in addition to Dr. John Rourke and the other friendly staff at the Compton Herbarium, Cape Town, for providing study access to the herbarium collection, and also to Paul Debbert for sharing information on this species.

Literature

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Bennett, S.T. and Cheek, M. 1990. The cytology and morphology of *Drosera slackii* and its relatives in South Africa, Kew Bulletin 54(2): 375-381.

Rothfels, K. and Hermburger, M. 1968. Chromosome size and DNA values in sundews (Droseraceae), Chromosoma 25(1): 96-103.

Writings from the Readership

Favorite Anecdotes on Adrian Slack

Keywords: recollections: Adrian Slack.

It Just Sprang Up Out of the Peat!

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I first met Adrian in the mid-1980s, when he was running his famous nursery, Marston Exotics. At that time I had a very small nursery in Borneo, growing and exporting *Nepenthes*. Adrian's enthusiasm for carnivorous plants was such that he was one of my first customers, and I regularly sent small shipments of plants to his nursery. I finally got the chance to meet him whilst on vacation in England in 1984 and was immediately struck by his enormous energy and enthusiasm. After a tour of his nursery we retired to his local Public House (i.e. a bar), the Castlebrook Inn in Compton Dunden for a few beers. I was surprised, when just after entering the pub, Adrian clambered up onto a table and announced: "Listen everybody, this is my good friend Robert who has come all the way from Borneo." Naturally, many of the regulars there knew Adrian well and smiled fondly to themselves, however there were a number of people who, like myself, were from out of town, and I can still clearly remember their surprised expressions. Adrian signed a copy of his book for me that day. His 'signing' runs to a whole page, and that book is now one of my most treasured possessions.

Figure 1: *Nepenthes rajah* x *burbidgeae*, photo Robert Cantley

In 1985, while jungle trekking in Borneo, I stumbled across a *Nepenthes* plant with the largest pitchers I had ever seen. It was a

hybrid between *Nepenthes rajah* and *Nepenthes burbidgeae*, and had absolutely beautiful and enormous pitchers (see Figure 1). One of the largest lower pitchers was removed and shipped to England in time for Adrian to exhibit it in that year's Chelsea Flower Show. The pitcher took pride of place on his stand. There was no plant attached, not even a leaf, just a single massive pitcher and a short length of tendril, the end of which he buried in the peat covering his stand. I happened to be standing nearby when a BBC television camera crew arrived. They immediately homed in on the unusual pitcher and set up their camera to film it. During the filmed interview the presenter (anchor-man) asked Adrian what the pitcher was. Adrian removed his trilby hat, scratched his head and with a puzzled expression on his face replied: "I have absolutely no idea at all, it just sprang up out of the peat last night, and look!" he exclaimed, peering into the cavernous depths of the pitcher, "It seems to have devoured a frog already!" The anchor-man was lost for words...

Adrian Slack is a unique character, and his active presence in the world of carnivorous plants is greatly missed.

Working for Adrian Slack

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In the summer of 1979 I began working for Adrian Slack at Marston Exotics in Somerset. My duties as a novice consisted in the main of repotting and dividing the *Dionaea*, dead-leafing the *Sarracenia*, watering all the plants and building a new lagoon to take the expanding number of plants. I got the job through my father, Roy Cheek, a well-known horticulturist in Somerset. Adrian needed someone that summer to look after one of the out-stations of Marston Exotics near Barton St. David, and I was lucky enough to be taken on.

Before my enlistment with Adrian Slack that summer, I was already familiar with his name through an article that he had written for the Carnivorous Plant Journal of the Carnivorous Plant Society, which I had joined in London the previous year, on its creation. His text (Slack, 1978) elaborated in great detail a technique for raising *Drosophyllum lusitanicum* from seed to maturity as a small perennial shrub. The article was undoubtedly written from long experience with his subject and was the best part of that issue of the journal, as I recall. Clearly, here was someone with a deep knowledge of carnivorous plants.

At that time Marston Exotics was easily the biggest carnivorous plant nursery in Europe. However, the out-station at which I worked consisted of only a single large polythene tunnel tucked away behind a chicken barn in a farm managed by one of Adrian's friends. Previously, Adrian had had other outstations scattered nearby. The main retail site for the business had been at Marston Mill (run by Adrian's first business partner, Timothy Heneage). At about that time, I believe, it was being transferred to another site at Compton Dundon, west of Glastonbury, which was owned by John Spiers, the third and last partner of the Marston Exotics business in Somerset. At the beginning of each week, I would cycle from Bridgwater, where my parents lived, beyond Glastonbury to West Pennard, and camp in my tent at a farm there, commuting daily to my work place. Sometimes I would sleep in the poly-tunnel amongst the plants. A major drawback was that at 4 a.m., I would be woken up by the dawn.

Adrian would visit once or twice a week to see how the work was going. He enjoyed tootling around the country lanes in his Morris. He would acidify the water tanks, deliver more stock for me to work on, pay me, and, out of the kindness of his heart, teach me such things as his method of propagating *Drosera* from leaf-cuttings, or the difference between *Sarracenia alata* and *Sarracenia flava*. I learned a great deal from him on the subject of growing carnivorous plants, both then and since. He talked of his selection of cultivars, his development of hybrids with certain preferred species clones, and his mischievous spreading of *Sarracenia purpurea* in Scottish bogs by lobbing *Sphagnum*

"bombs" with seeds onto inaccessible bog islands. Once or twice he took me to one of his favourite watering holes, the "Rose and Portcullis" at Butleigh for a ploughman's lunch. It did not take much to learn of his enthusiasm for civil-war battle reenactments. He was always on the cavalier side, of course. He was and is a man of diverse interests and abilities. Few realize, for example, that the beautiful line drawings that illustrated the Marston Exotics Catalogue and his books were drawn by Adrian himself.

"Carnivorous Plants", Adrian's first and foremost book (Slack 1979), came out that autumn. It was a revolution in the literature on the subject of the horticulture of these plants. Written in beautiful prose, it remains the bible of carnivorous plant growers, owing to its comprehensiveness, the fruit of years of meticulous research in the Royal Horticultural Society library in London and many years of experience and experimentation with a wide range of living carnivorous plants. It also focussed the interest of a broad public on carnivorous plants, and Adrian Slack himself. Adrian began to make television appearances and was interviewed on the radio.

That autumn, I went back to university and did a herbarium specimen-based project on *Sarracenia*, for which Adrian generously supplied much material. In his position, I doubt that I would have given up material of rare species such as *Sarracenia oreophila* for this purpose, as he did. He has a benevolent disposition and has helped not a few other growers of carnivorous plants. He was always generous with advice to other growers, and enjoyed the free exchange of information on horticultural techniques and botanical facts, whether at his nursery, or by letter or at the annual Chelsea Flower Show, at which he was a regular fixture in his Panama hat and with his wine glass. He encouraged and supported the fledgling Carnivorous Plant Society by lending plants for shows and by writing articles for its journal. Indeed, it seemed to me that although he took an interest in the financial side of his business, Marston Exotics, making money was not the first thing in his life. To a degree, carnivorous plants for Adrian were a hobby that had gotten gloriously out-of-hand. Adrian's books and Marston Exotics were extensions of his plant collection and his personal research. At that time, although others were beginning to be interested in collecting, growing and documenting these wonderful plants, no one else in Britain had taken the subject so far as Adrian.

In the summer of 1980, I began a year working for Peter Taylor at the Royal Botanic Gardens, Kew, which persuaded me to seek a career in taxonomic botany, but I would visit Adrian whenever possible on my weekends home to Somerset to visit my family and tend my growing collection of carnivorous plants. As I progressed with my academic career, Adrian would bring up questions of plant identification and nomenclature during my visits. By then he was in contact with people from around the world who were interested in carnivorous plants. By this means he obtained new material for Marston Exotics and for his books. At some stage in the 1980s, Marston Exotics must have held the world's largest range of carnivorous plant species, hybrids and cultivars. The mail-order business was thriving, and the company had begun to move into selling to garden centres. Newspaper articles on Marston Exotics, its plants and its partners were not uncommon in the local and national press. One that got particular attention, I remember, featured *Sarracenia* × *excellens* 'Lochness'. Adrian and his plants, particularly his *Sarracenia* breeding, were treated in some detail in a chapter in a popular book on leading naturalists (Pettifer & Brown, 1981). Here Adrian was rubbing shoulders with the likes of Konrad Lorenz, Miriam Rothschild and Tom Eisner. In the process of researching Adrian for this book, the writers took him out to the USA and for the first time, Adrian got to see *Sarracenia* in the wild. After the success of his first book, Adrian began a second, with many more colour pictures than the first (Slack, 1986). It also was much in demand.

Through Adrian I first learnt of the likes of Eric Green and Allen Lowrie. I remember Adrian being convinced in the early '80s that stock of a sundew he had was a new species. He had received it from Eric Green in South Africa, and was marketing it in the Marston Exotics catalogue as *Drosera aliciae* "Highland Red". At the time I was sceptical. However, several years later, observing the peculiar, thick, red, uncinate hairs on the

lower surface of the leaf (unknown in *Drosera aliciae*), it occurred to me that he might be right. I found supporting characters. This led to a chain of events that ended in me describing it, my first published species, as *Drosera slackii*, in his honour. It was published in 1987. By the time that it was published the stressful circumstances which led to the sale of Adrian's beloved Marston Exotics had unravelled. Adrian's business partners decided to move on. Clearly, new partners and investment were needed. I was flattered and overwhelmed in the summer of 1986 to be approached by Adrian as a possible business partner, but reluctantly declined for want of capital and the temptation of an alternative career in taxonomic botany. The pressure to find a new partner became more pressing. In the autumn Adrian tragically suffered a severe stroke. Marston Exotics was later sold, and the plants were transported to a new site in the Midlands, hundreds of miles away.

Adrian now lives quietly, with his sister Julia, in Barton St. David. He learned to walk again, but his speech and writing are still affected by his stroke, although both have improved steadily over time. He still enjoys his collection of plants as the adjoining photograph, taken in the summer of 1999, shows (see Back Cover).

Most of us that grow carnivorous plants today owe a great debt to Adrian Slack. He has inspired us through his unparalleled books on the subject, and has made available for us to cultivate and study many plant species, previously unobtainable.

I shall always be glad of taking that opportunity long ago, to work for Adrian, and to have known him subsequently. Thank you, Adrian for firing my interest in carnivorous plants and for teaching me so much on the subject.

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His Cream Linen Suit and Panama Hat

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In the summer of 1987 I had the unique opportunity of buying Marston Exotics.

The day I drove down to Somerset to see Marston Exotics tucked away in deepest countryside is one I shall never forget. The nursery was like an oasis filled with the strangest plants I had ever seen. It was mid August and the first thing I saw as I entered he tunnels were the *Sarracenia*. The colours and flowers were truly stunning and it did not take long to decide to buy the business.

Adrian was suffering from the affects of a severe stroke at the time, so his partner John Spiers dealt with the business and over the next few weeks told me of some of Adrian's life and travels. I only met Adrian twice and sadly he could not communicate. We all felt the deepest sympathy for him after all of thirty years of dedication of growing and breeding these amazing plants, and more importantly bringing to the public's attention one of the largest collections at that time.

Adrian was intelligent, quick witted and full of enthusiasm. Being related to the Tolstoy family made his history even more intriguing. He spent his early childhood in Herefordshire (ironic to think that I later moved Marston Exotics to the same area), and his interest in carnivorous plants started when he found an illustration of a *Drosera rotundifolia*, this drove him to seek out the plants in the local wetlands and bogs. His interest in plants carried him through to the age of 18. Beginning a career in landscape architec-

ture was his ambition.

By the late 1950s Adrian became enthralled with carnivorous plants and his other interests—painting and English 16th century history—took second place. He spent three years in Cumberland, Northern England in the early 1960s and had access to the Bishop of Penrith's walled garden, which was full of old and Victorian glasshouses. Here his early hybridising of *Sarracenia* began and trials were carried out on *S.* × *excellens*. He also tested cultivating carnivorous plants outdoors in the British climate.

He eventually made his base at Frome in Somerset, where at an old mill and garden he started commercially producing insectivorous plants and called his business Marston Exotics.

Adrian developed an image of a romantic English naturalist. A committed vegetarian and addicted to French wines, he could always be seen at flower shows like Chelsea captivating an audience who would flock around his stand. Adrian was the complete English Edwardian eccentric.

After a trip to the Okefenokee Swamp in Georgia and northern Florida, U.S.A. in 1974, Adrian's enthusiasm on seeing the *Sarracenia* specimens spurred him to expand on hybridising. Together with John Watkins and Paul Temple, he founded the British Carnivorous Society during this time.

Adrian's business was expanded by mail order, covering the U.K. and many parts of the world. His many lectures and avid writings led the way to radio and television broadcasting. He continually experimented with the cultivation of aquatic and tropical *Utricularia*, Mexican *Pinguicula*, tuberous *Drosera* and *Drosophyllum*. By 1976 work had started on his first book, 'Carnivorous Plants,' covering the plants' history, natural habitat, and cultivation notes. It captivated audiences, not only in Britain, but worldwide.

During the early eighties Adrian showed magnificent displays of Carnivorous Plants at the Chelsea Flower Show, winning the R.H.S. Lindley Silver Medal in 1981, and after that became five times Gold Medalist. His enthusiasm for talking and explaining to all ages about the plants was exceptional. The lasting picture in my mind is seeing him in his cream linen suit and Panama hat talking to a twelve year old, showing the plants on the show-stand, with a glass of French wine not far away.

A Special Debt of Gratitude

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During my world travels in 1986, I was humbled by the privilege to meet with Adrian Slack at his home. Although this was more than a few years ago, it still remains fresh in my mind and a fond memory. This man, my mentor for the growing of carnivorous plants during the earlier years of my collecting, never hesitated to help with the many questions I would throw at him in the letters that streamed back and forth. Adrian's two books, "Carnivorous Plants " and "Insect Eating Plants and How to Grow Them", take their pride of place amongst my many other books dedicated to this fascinating hobby. To this day, his books are still some of the most accurate in information for the growing of these sometimes difficult plants. To Adrian I also owe a special debt of gratitude, for his never tiring efforts in growing the *Drosera* from here in Western Australia. He succeeded in growing and distributing the pygmy *Drosera* "Species Bannister" I discovered in the late '70s, that eventually became *Drosera mannii*. To Adrian, I thank you. You deserve all the accolades dedicated to you. Best wishes always!

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I first met Adrian Slack in 1985 when I was trying to learn how to grow a Venus Flytrap. By a marvelous bit of luck, he was in my neighborhood library. Adrian reassured me that my task was surmountable, and showed me how to avoid repeating the Dionaeicide that characterized my disastrous attempts in grade school. In the following weeks, Adrian taught me a great deal. But then, alas, I had to leave to begin my graduate studies. I wondered when I would see him next.

Two years later, I encountered Adrian again, this time in a bookstore. He was as engaging as ever, and for many months following he tutored me again on carnivorous plant care. His gentle wit and lucid manner was a refreshing respite from my studies—what better way to rejuvenate my spirits, sagging under the weight of General Relativity, than to hear about Adrian's views on the subtleties of *Pinguicula moranensis* color (or rather, "colour") forms? or to review Adrian's primer (rhymes with simmer) on *Triphyophyllum*?

In time, it seemed I learned all I could from Adrian. But as if sensing my wandering attentions, he returned in 1986 with a second volley of lugubrious commentary on carnivorous cultivation. I was engrossed once again.

Ah yes, Adrian, my good friend.

If you have not yet realized it, my relationship with "Adrian" is entirely artificial. I have never met him, spoken with him, or even written to him. When, as above, I refer to "Slack," I am usually referring to his two books. But despite never having met him, I hold him in highest regard. And I am not alone in having such anonymous affection for him—hordes of carnivorous plant growers who have been raised (and also, raised plants) on his books consider him their horticultural mentor.

Since a number of carnivorous plant horticulture books have been published in the last decade, have Slack's two books weathered well? Yes, yes, yes. His books remain the standards against which all subsequent carnivorous horticulture books have been measured; few survive the comparison intact!

Consider Slack's first book, "Carnivorous Plants." The writing is slippery-smooth, accurate, and entertaining. Jane Gate's photographs are still some of the best, anywhere. And did you notice that Slack himself drew the many marvelous drawings in the book? He is an extraordinary botanical artist!

His second book, "Insect-Eating Plants & How to Grow Them," is smaller in format but larger in personality, as Slack lets his presence be felt more than before. He tells us that Venus Flytrap flowers are "among the most unattractive I have seen," and that not only is the *Sarracenia* hybrid *S.* × *umlauftiana* unspeakable-sounding, it is also unspeakable-looking! If he is critical, it is because his horticultural standards are so high. Over his twenty-five year career of hybridizing *Sarracenia*—during which tens of thousands of seedlings were raised—he deemed only a dozen as being worthy of cultivar names.

Slack's greatest contribution to horticulture is in raising a crop of growers who are working to maintain his high standards of horticultural excellence. The ICPS has become the cultivar registration agency for carnivorous plants, and horticulturists are now registering cultivars of exceptional value and beauty. This vision of Slack has been realized.

So return to your carnivorous greenhouses, terraria, gardens, and bogs, and in Slack's exalted tradition, grow the most captivating plants you can. Develop cultivars that make us quiver with delight! But I warn you—Slack's standards are high. Look at the cultivars in his books and do your best to match them in quality. It will not be easy. Make Slack, er, Adrian, proud!

A Great Local Character

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When our Biology Department moved to a new building in 1972, we received a new greenhouse for its roof. The greenhouse began with a general collection, including cacti, succulents and orchids. I am an orchid enthusiast so the orchid collection grew bigger at the expense of the cacti. I smuggled the cacti downstairs, one by one, and either put them on my colleague's lab window-sills or into one of the general purpose greenhouses downstairs.

Tim Heneage, later a director of Marston Exotics, was a member of Millfield's Maths Department in those days. One day he invited Mike Cole (my head of department) and myself to visit his home to meet his friend Adrian Slack, and to see some of Adrian's carnivorous plants which were housed in Tim's greenhouse. It was a remarkable day in every way. Tim lived in a huge mansion house. Both he and Adrian are wonderful company with a fund of hair-raising stories, many involving their participation in the "Sealed Knot", where they dress up as Roundheads and Cavaliers, and re-enact old battles. Adrian is a larger than life character with a fondness for Edwardian clothes and a breathtaking knowledge of all things horticultural. Going into their greenhouse was a completely new experience for Mike and myself. I had never seen *Sarracenia* in my life before, and here before me were many hundreds, including rank after rank of *S. flava*, sticking up like mad organ-pipes above the rest. And it was not just *Sarracenia*. Adrian showed us plant after plant; *Drosera*, *Cephalotus*, *Byblis*, *Pinguicula*, *Utricularia*, an enormous *Drosophyllum* several years old, *Nepenthes*, Venus Flytraps... It was the largest collection of carnivorous plants in Europe. Adrian told me that the single original plant of *S. flava* came over from the USA on the Queen Mary.

We saw a lot of Adrian after that. We started putting together a collection of carnivorous plants and Adrian gave us much advice. He was very interested in microscopy and came over to Millfield many times to look at our binocular microscopes and our photomicroscopy set up. On several of our annual "Parents' Days" he put on an exhibition and sale of his plants in one of our downstairs labs; we bought many plants ourselves. About then, around 1977 or 1978 Adrian completed his first book "Carnivorous Plants" and I remember his showing us his line drawings and some of Jane Gate's superb colour photographs.

It was about then that Tim Heneage and Adrian started Marston Exotics. Although based in Frome, they had many greenhouses and polytunnels at Compton Dundon, just over the hill from Millfield (which is on the edge of Street in Somerset). We continued to buy plants from them for many years. In the rush of school life I have rather lost touch with Adrian, but he still lives nearby where he remains a great local character.

He Loved to Shock Them

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My first encounter with a carnivorous plant was when I was nine years old. A field trip into the mountains of Wales introduced me to the double delight of wading through *Sphagnum* bogs and encountering a plant that ate insects. Wow, heaven!

Delight faded as, try as I might, I could not grow a sundew, nor any other carnivorous plant. Years then passed as I worked overseas with no thoughts of carnivorous plants. On my return to the UK, my brother, who knew my habits better than I did, bought me a birthday present—"Carnivorous Plants" by Adrian Slack. Joy!

The obvious place to buy plants was Adrian's own Marston Exotics, and so started my communication with him. Adrian's membership in the Society of Cavaliers and Roundheads (the largest military re-enactment society in Europe, dedicated to re-enact-

ing the 17th Century English Civil Wars) led to talks of re-enacted battles where, characteristically, Adrian remembered finding time to sip wine while others fought! (England's history might have been so different had Adrian been a real Roundhead or Cavalier!). Indeed, Adrian could rarely be seen without his trademark glass of red wine, which he would readily share from his handy stock of bottles that would last the show (maybe!). But to see Adrian at his happiest was best done by watching him in the company of women. Adrian received frequent invitations to speak at Ladies Meetings and delighted in letting these ladies know, in deliberately shocking form, all the gory detail of a fly's death in the arms of a Venus Flytrap or sundew. He loved to shock them, and took a childlike delight in it. And who can blame him?

It is a great shame that Adrian is not able to be the public figure he once was. I miss his individuality and his eccentricity. As to carnivorous plants, Adrian had a knack of being informative whilst remaining secretive. Yet he shared enough to teach many of us how to begin and I happily admit to being one of his students. And I treasure my graduation day when he finally approached me at one Chelsea Flower Show to ask if he could photograph one of my plants!

New Cultivars

Keywords: cultivar: *Sarracenia* 'Adrian Slack', *Sarracenia* 'Vintage Slack', *Cephalotus* 'Hummer's Giant', *Pinguicula* 'Aphrodite'.

Sarracenia 'Adrian Slack'

Received: 10 May 2000.

When the idea for an issue of Carnivorous Plant Newsletter commemorating Adrian Slack was developed, it was obvious that it would be an ideal time to christen a cultivar *Sarracenia* 'Adrian Slack'. To live up to its namesake this cultivar would have to be something special, so I (BMR) looked for candidates. During my search, I contacted Peter D'Amato (California Carnivores). Peter said that while he had some lovely plants worth cultivar status (see *Sarracenia* 'Vintage Slack', below), he had another idea. Long ago, Peter had visited Bob Hanrahan's property in Alabama and saw a hybrid so beautiful that it brought him to his knees in rapture. This sounded good! I called Bob, and even though Bob has grown a vast number of *Sarracenia* over the years on his property and in his greenhouses, he knew exactly which clone I was inquiring about. He said that the plant was still alive, and that he would send a photograph.

I have seen many *Sarracenia* plants, but when the photo from Bob arrived, my jaw dropped. Clearly, this extraordinarily colorful and well-shaped clone was the long sought candidate for *Sarracenia* 'Adrian Slack' (see Front Cover and Figure 1). We nominated and submitted this cultivar name for registration on 28 March 2000.

While the exact parentage of *Sarracenia* 'Adrian Slack' is unknown, it is almost certainly a mix of *S. flava* and *S. leucophylla*. It is unclear if back-crossing is involved. In general form, the plant produces large pitchers much like those of *S. flava*. The influence of *S. leucophylla* is expressed, at most, as a slight undulation in the pitcher lid. While *S. flava* controls the pitcher form, *S. leucophylla* influences much of the pitcher coloration. The pitcher lid is arrestingly white, shot through with deep red veins (from *S. flava*). The upper pitcher tube is also heavily veined and lightly fenestrated. These pitcher characters define this exquisite cultivar. The flowers are not as spectacular as the pitchers, but are still intriguing. The petals are light pink, almost white, but may show occasional yellow highlights

Bob found this plant in the 1980s, growing in the Milton area of western Florida. It has grown well since then, and when left undisturbed produces the astonishing coloration documented in the photograph. This is a superior plant, and honors a superior man.

Sarracenia 'Adrian Slack' is very rare in cultivation, but is being propagated under

Figure 1: *Sarracenia* 'Adrian Slack', photo Bob Hanrahan.

Figure 2: *Sarracenia* 'Vintage Slack', photo Barry Meyers-Rice.

guard for future distribution. Specimens are not yet available, but news on how to obtain it will be made public when the plants are ready.

—Bob Hanrahan, Barry Meyers-Rice • 2336 Cross Creek Drive • Powder Springs GA 30127 • USA

Sarracenia 'Vintage Slack'

Received: 10 May 2000.

This plant is a *S.* × *mitchelliana* cross. This cultivar is similar to typical *S.* × *mitchelliana* crosses, but has a particularly noteworthy feature: the collar and lid has a distinguishing white-edging rarely seen in similar hybrids (see Figure 2). The pitcher tube is primarily green with whitish-pink fenestrations in the front upper part. The reduced ala is edged in red. The collar and lid are held upright, extremely frilly, and bear abundant bristly hairs on the lower inner surface. The collar's yellow-green background is overwhelmed by burgundy veins and carmine-pink blotches that extend to the upper back of the pitcher tube. The pitchers are never more than 30 cm (12 inches) tall. The flower petals are red.

This plant was sent to me long ago from Bob Hanrahan. I recognized the quality of the plant shortly after it reached maturity. I coined the name 'Vintage Slack' on 31 January 2000, and submitted it for registration on the same day. The name, of course, honors Adrian Slack, who among other things is a noted wine-enthusiast. It is appropriate that this multicolored plant, which appears stained by many different wines, was selected for cultivar status on our property, as we are located at a winery. This cultivar should only be reproduced by vegetative means.

—Peter D'Amato • California Carnivores • 7020 Trenton-Healdsburg Road • Forestville CA 95436 • USA • califcarn.com

Submitted for registration on 23 February 2000

In July 1998 Mr. Jan Flísek made a bilateral cross-pollination of the Mexican plants *Pinguicula agnata* and *P. moctezumae*. Four weeks later, ripe seeds were harvested from *P. agnata*, whereas the pollinated *P. moctezumae* did not produce seed. Mr. Kamil Pásek sowed most of the seeds (from two developed capsules) under sterile conditions in vitro at the end of August 1998. The rest of the seed was sown conventionally. Germination of the seeds was in both cases almost 100% within 3-4 weeks.

Owing to rapid in vitro growth over a period of 18 months, we were able to observe the nature of a large number of individual plants. We did not find any significant variability among the individual germinated plants; hence we regard all the individuals resulting from this crossbreeding as identical. The plants are eminently interesting, unique and deserve a special epithet. We have sufficient information to describe the new cultivar we name *Pinguicula* 'Aphrodite' (see Figure 3).

The cultivar *Pinguicula* 'Aphrodite' is characterized by its very long, narrow leaves with rounded tips which terminate in a point. The summer rosette consists of up to 15 leaves which are up to 12 cm long and 2 cm wide; the leaf-edges roll downwards. The erect leaves display a characteristic, descending-arch along their lengths. Under intense summer sunlight, the leaf-edges of leaves can be reddish, whereas the leaf midribs remain green along their entire length. During the winter, the rosette size decreases, whilst the number of leaves increases to as many as 25. The leaves of the winter rosette are up to 5-6 cm long and 1.3 cm broad; mostly they are flat and light green.

The plants bloom all year round, indeed during winter the plants can have the most flowers open at the same time. The color and size of the flowers changes as the flowers age. Freshly open flowers are relatively small and are generally dark-violet. As the flowers age they enlarge and fade to pink. When viewed from the proper angle the petals reflect light to give a shiny appearance. The posterior side of the flower is significantly lighter in color. Gentle, faint veining is apparent over the entire surface of the five (very exceptionally six) petals; this venation is more distinct towards the flower center. The entrance to the corolla tube and the tube itself is bright yellow, and minutely hairy. Mature flowers can reach 4 cm in a diameter and this fact ranks them among the true giants of the *Pinguicula*! The spur of the flower is narrow, slightly bowed and may be up to 1.5 cm long. Flowering time is about four weeks depending on the growing condition. Flower stalks can reach 15 cm in length (exceptionally 22 cm), the upper part of the stalk (about 1-2 cm) can be brownish-red, and the lower part is green and covered with tentacles. The sepals are a rich green color. We have tried to crossbreed different individuals of *Pinguicula* 'Aphrodite', or *Pinguicula* 'Aphrodite' plants using other species and hybrids as pollen donors (namely, *P. agnata*, *P. emarginata*, *P. esseriana*, *P.* 'Gina', *P. gracilis*, *P.* 'Sethos', *P. moctezumae*, *P. rotundiflora*, or *P. sharpii*). However the plants have never produced any seeds so it seems *Pinguicula* 'Aphrodite' is sterile. We have used *Pinguicula* 'Aphrodite' as a pollen donor in hybrid crosses, and have produced seed several times. At present we are unsure about the quality of these seeds.

This cultivar is very vigorous and easy to grow using the standard methods for cultivating Mexican *Pinguicula*. Moist planting medium (but not waterlogged), even during the winter season, leads to better growth of the plant. We can recommend only one successful method to propagate this cultivar without any problems—using leaf cuttings.

This cultivar is named after Aphrodite, the Greek goddess of love and beauty. Beautiful Aphrodite was much in demand and liked by many of the gods. We hope that *Pinguicula* 'Aphrodite' will find a place in many collections of carnivorous plants as an adornment at least, just as Aphrodite was the gem of the Greek goddesses on Mount Olympus.

In addition to the above data we include a short description of the parental plants used

in making *Pinguicula* 'Aphrodite'.

P. agnata (section *Agnata*; maternal plant): the diameter of the rosette is 25 cm, leaf 4-5 cm wide, the edge of the leaf is reddish in summer. The flower is white, 2.5 cm in diameter, with blue edges and a minute yellow central spot, fragrant. Origin unknown (plant was obtained at the floristic exposition, 1990).

P. moctezumae (section *Orcheosanthus*, paternal plant), the diameter of the rosette 20 cm, leaves green and narrow (7 mm). The flower is pink, 3 cm in diameter, with a well-marked white central spot. Origin Oliver Gluch, Germany (1998).

We wish to extend great thanks, especially to Mr. Loyd Wix—England (loyd.wix@talk21.com), Oliver Gluch—Germany (oliver.gluch@t-online.de), Barry Meyers-Rice—USA (barry@carnivorousplants.org), Jan Schlauer—Germany and Michiaki Mabuchi—Japan (mabuchi@vbl.kyoto-u.ac.jp) for their critical comments, and also we thank Mr. Marek Svítek for his help in making the English translation of this text. The plants *Pinguicula* 'Aphrodite' have been sent as a present to the above-mentioned friends and other ones some time ago. The plants can be obtained also from the addresses of both authors without any problems.

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Cephalotus 'Hummer's Giant

Submitted for registration on 10 May 2000

In September of 1986 I received from Steve Beckwith (a pen pal in Adelaide Australia) about half a dozen good-sized plants of *Cephalotus follicularis*. All had deep maroon colored pitchers at least 5 cm (2 inches) in length that had over-wintered from the previous year's growing season. It was obvious that the plants had been dormant for some months and were just beginning to start their growing cycle again. It was the first evidence I had that the plants were perennials that required a dormant cycle.

I distributed a number of the plants to close associates and started growing the rest inside a terrarium where I have maintained them ever since. This was the beginning of what was to be a very successful venture into growing a particularly large and vigorous form of *Cephalotus*. Vegetatively propagated stock of it has thrived and multiplied through the years so much that I have been able to establish this particular clone into many private and commercial collections around the globe!

This particular clone produces pitcher leaves up to 6 cm (2.5 inches) in length and about 2.5 cm (1 inch) in width. It usually takes about three years for plantlets grown from leaf cuttings to reach maturity and full size. To my knowledge, only one other person growing this clone has obtained pitcher leaves larger than mine—Bill Mclaughlin of the US Botanical Gardens grew them to about 8 cm (3 inches) in length. (I never actually measured the pitcher leaves, but knew they were larger than mine.) His plant was grown under controlled conditions in a large conservatory, and may represent the maximum pitcher leaf size attainable with this clone. Since at maturity this clone reaches much larger sizes than normal *Cephalotus* plants in cultivation, I am establishing it as a cultivar, and am naming it *Cephalotus* 'Hummer's Giant' (see Figure 4). I coined this name April 3, 2000, although this cultivar name has been commonly used for the plant for years before that.

My growing experience has been with indoor terrarium type set-ups using a mixture of peat and white sand. *Sphagnum* on the surface is not recommended since it can often outgrow the plants and can require removal. The substrate should

Figure 3: *Pinguicula* 'Aphrodite'. Photograph by Jan Flísek.

Figure 4: *Cephalotus follicularis* 'Hummer's Giant'.

always be damp to the touch but well drained. This is very important. Rainwater is best, but distilled water is fine too. If the plants are to be grown using indoor terraria, the best lit location is in a large south-facing window (north-facing, for growers in the southern hemisphere) where the sun's rays will be the most prevalent. Your tank will get sufficient lighting from the sun without artificial lighting! The plants will receive optimal amounts (4-6 hours) of sunlight each day from late August to late March and early April. During the summer, when the path of the sun in the sky is very high, direct sunlight will not be able to enter the window and illuminate the terrarium. As such, direct light will cease from April until late August, but the plants will continue to receive high levels of indirect light. It is during this period of lower light that the plants produce their noncarnivorous leaves. If little or no sunlight is available fluorescent lights can be used. Place them no further than 15 cm (6 inches) above the plants, 14-16 hours a day.

Propagation can be done using almost any part of the plant, including the roots, but I use the noncarnivorous, flat leaves. It is easy and efficient. For a propagation chamber I use plastic tubs with sealable clear plastic lids, such as those available at salad bars. I fill the bottom half with live green *Sphagnum* (damp, not wet). After carefully pulling each leaf away from the parent plant so as to get the entire leaf stem, I slide the lower end at a 45° angle into the moss, laying the flat leaf blade on the surface. The container is then closed and put in high indirect (not direct!) sunlight, with temperatures at about 16-27°C (60-80°F). After about a month or so the bottom end of the leaf stem will root, callous, or both. Soon after, one to several growth shoot will develop. Carefully separate the moss from around the leaf and pull up the leaf with the shoots and roots. This can be transferred into a permanent substrate. If further propagation is desired, use a small knife or pair of tweezers to carefully separate the shoot and root from the base of the leaf stem. The shoot can be planted, and the leaf can be reinserted back into the moss! I have used some leaves three times using this method, although usually after two times the leaf yellows and dies.

Root-rot is perhaps the biggest problem with *Cephalotus*, especially when a plant is moved or a tank is set up for the first time. Using a fungicide is of little help. Why it happens is probably a combination of factors which may include poor health and the presence of fungi and bacteria. Once a tank has a good number of established plants, additional plants seem to take well to their new environment. When setting up a tank with fresh peat and sand, it can take a while before it becomes "friendly" to newly plants, but once it does a stable micro-ecosystem is created.

It is important to remember that once *Cephalotus* plants are established, undisturbed for a long time, and have grown to a large size, they do not like being uprooted and disturbed! If you ever decide to move a large plant, take a good measure of the soil surrounding the plant too. This way you will not disturb the rhizome and root system too much. Use a knife! If you do not move your plants carefully like this, they will probably die. Young or small plants separated from larger ones usually do not seem to have this sensitivity to being moved. Usually.

Supplying *Cephalotus* with a dormant period is something I have never attempted to do, since I have always grown the plants indoors. Ignoring the issue of dormancy has always caused me some concern. However, despite nearly fifteen years of experience with specimens of *Cephalotus* 'Hummer's Giant', I have yet to observe any problem that seems to be associated with the lack of giving them a cool dormancy period. During the spring and summer seasons, growth slows or may even stop. While I consider this a resting period, I certainly cannot classify it a true dormancy. Even so, it may give the plants enough of a rest to carry on their growing cycle. Clearly, the plants have continued to flourish and multiply for years. This is a surprising adaptation for a seasonal plant.

—Editor's note: As John mentioned in his article, he has been distributing this cultivar for many years. Growers with gigantic *Cephalotus* specimens can be quite confident it is the same clone that John described in his article. John is busy with his fieldwork and collection, so is unable to send people specimens of this cultivar, but if you want it—look around. It is increasingly common in collections. (BAMR)

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Technical Refereed Contribution

Medium Optimization for Growing *Aldrovanda vesiculosa* in vitro

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Kondo *et al.* (1997) reported that Japanese and Polish strains of *Aldrovanda vesiculosa* can be grown in a sterile in vitro culture. They used Gamborg B5 liquid medium (Gamborg *et al.*, 1968) with 2% sucrose. While the concentrations of nutrients such as NH_4^+, NO_3^-, PO_4 (and sometimes also K^+) are very low in both *Aldrovanda* habitats (Kaminski, 1987; Adamec, 1999a) and in outdoor cultivation tanks (Adamec, 1997), the Gamborg B5 liquid medium Kondo *et al.* (1997) used is very concentrated (in mg l^{-1}: KNO_3, 2500; $(NH_4)_2SO_4$, 134.0; NaH_2PO_4, 130.5; $CaCl_2.6H_2O$, 223.5; $MgSO_4.7H_2O$, 250.0; $FeSO_4.7H_2O$, 27.8; Na_2EDTA, 37.3; H_3BO_3, 3.0; $MnSO_4$, 10.0; $ZnSO_4.7H_2O$, 2.0; $CuSO_4.5H_2O$, 0.025; $CoCl_2.6H_2O$, 0.025; $Na_2MoO_4.2H_2O$, 0.25; KJ, 0.75; inositol, 100; thiamine, 10.0; nicotinic acid, 1.0; pyridoxine, 1.0). This solution is not ideal for *Aldrovanda*: the very high KNO_3 concentration is unnecessary since *Aldrovanda* only slightly takes up NO_3^- ions (Adamec, 2000), and the boron concentration might be dangerously close to toxic (cf. Adamec, 1999b). We tried to find an improved substitute for the B5 medium.

The following modifications of the B5 were tested first: A)100% B5 (as a control); B)75% B5; C)50% B5; D)100% B5 but KNO_3 only 500 mg l^{-1}; E)75% B5 but KNO_3 500 mg l^{-1}; F)50% B5 but KNO_3 500 mg l^{-1}. All modifications contained 2% sucrose, and their initial pH was set at approximately 5.5 before autoclaving at 125°C for 20 min. To investigate a possible role of tannins for *Aldrovanda* growth in vitro (Kaminski, 1987) each trial also had a variant that was supplemented with sedge litter as a natural source of tannins; (approximately 200 mg dry weight of dead brown *Carex gracilis* leaves per 100 ml of medium in 150-ml Erlenmeyer flasks were added before autoclaving). These media were slightly brownish, indicated the presence of tannins and/or humic acids. One plant of the Japanese strain in vitro with 1-2 apices was aseptically transferred to each trial medium. The media were not shaken. After 34 days of growth at 25-28°C under fluorescent lighting (14 h light/10 h darkness), plant growth was evaluated on the basis of plant size, structure, and color. No effect of sedge litter was observed, so the requirement of humic acids or tannins for *Aldrovanda* growth in the presence of sucrose and inositol is zero. Of all the trials, the plants in group A (the control) were the worst: the plants were smallest with small traps, some leaves were damaged and blackened. The plants at D and E were bigger and healthy, and those in B and C were even larger. The best (biggest

plants with big traps) were in F. These plants were 6-8 cm long.

Thus, of all the media tested, the best (F) was half-strength B5 with only 500 mg l^{-1} KNO_3. In contrast, the full-strength medium was slightly toxic. The plants in all the trials branched poorly. It was obvious that they only branched during a limited period, just after the transfer to new media. The pH of the old B5 medium from which the plants were transferred was only 3.2 and 3.4. Similarly, after the experiment, we measured pH of 3.1 in D and 3.4 in F medium. Since the uptake of NH_4^+ by plants leads to medium acidification, while that of NO_3^- to alkalization the strong acidification of the media measured confirms that NO_3^- uptake is unimportant. It is probable that very low pH in older media prevents the plants from branching.

In the second run, we tested the effect of dilution of the B5, KNO_3, and microelements (MI). Three apices were transferred to each Erlenmeyer flask. The growth conditions were the same as above. Since the growth period lasted 79 days the final cultures were too dense. The following modifications of the B5 were tested, and the results after the final growth phase are given below:
50% B5+500 mg l^{-1} KNO_3+50% MI: the best variant, mean 20.0 apices per flask, big and healthy apices, final pH 3.15;
25% B5+500 mg l^{-1} KNO_3+50% MI: bad variant, mean 10.3 apices, apices usually small, final pH unmeasured;
10% B5+500 mg l^{-1} KNO_3+50% MI: the second worst variant, mean 6.3 apices, apices usually small, final pH 3.41;
50% B5+250 mg l^{-1} KNO_3+50% MI: mediocre variant, mean 11.0 apices, apices bigger, final pH unmeasured;
50% B5+100 mg l^{-1} KNO_3+50% MI: the worst variant, mean 13.0 apices, small yellowing plants, final pH 2.94;
50% B5+500 mg l^{-1} KNO_3+25% MI: the second best variant, mean 18.3 apices, apices big, final pH unmeasured.

In the second tests, the best modification of B5 was the same as in the first set of tests: half-strength B5 with 500 mg l^{-1} KNO_3. We denote it as "standard medium". Thus, any further dilution of both macro- and microelements led to impairing *Aldrovanda* growth. It follows that KNO_3 concentration greatly influences the final pH of the media. At low [KNO_3], pH can fall well below 3.0 which, obviously, is far from the optimum. The "standard medium" has also shown to be quite suitable for red Australian *Aldrovanda* strains.

We have also found that the "standard medium" is also very suitable for growing terrestrial *Utricularia* (*U. longifolia, U. monanthos, U. humboldtii,* etc.) and *Genlisea* species (e.g., *G. aurea, G. violacea*) in vitro. In comparison with the results from the media often recommended for carnivorous plants (e.g., 30-50% the concentrations recommended by Murashige & Skoog (1962) solidified with agar), the growth of the above species in the "standard medium" is very rapid and vigorous.

We observed that when *Aldrovanda* plants from in vitro culture were transferred back to a nutrient-poor water in an aquarium or container their growth was very rapid for the following weeks. We suspected that the plants growing in vitro had very high nutrient content in their tissues. However, the elemental content in % of dry weight found in apices of young, in vitro grown Japanese plants was about the same as that in Polish plants growing vigorously in an outdoor culture (the values in parentheses are from Adamec (2000) for outdoor culture; see this paper for further experimental details): N, 1.24 (1.31); P, 0.48 (0.48); K, 2.21 (1.86); Ca, 0.24 (0.17); Mg, 0.11 (0.16). Since the mineral content of the in vitro plants are not elevated, it is possible that instead, the accelerated growth is due to an exaggerated richness sugar resources. These sugar resources might enhance the growth for a few weeks after a transfer to nutrient-poor and sucrose-free water.

Some carnivorous plant growers have tried to prepare a sterile in vitro culture of *Aldrovanda* by seed sterilization. When we attempted this, we encountered two prob-

lems. After a conventional seed sterilization (4.8% sodium hypochlorite for 25 minutes using 153 seeds from Polish and Romanian plants) we found a positive correlation between seed germination and contamination in various seed test groups (in 30% B5 + 75 mg/l KNO_3 + 2% sucrose; 14 h L/10 h D photoperiod). In all, 44.4% of the seeds showed signs of germination and 52.3% of the seeds were contaminated. Seed contamination mostly occurred at the micropylar end of the seeds after they had started germinating. So, most of ripe *Aldrovanda* seeds maintain microbial infection close to the lid (operculum), i.e., in the micropylar hole, even after a strong sterilization. In sterilized seeds, the infection is released mostly after the first signs of seed germination when the emerging radicle tears off the black lid (this stage is visible by naked eye; e.g. Kondo *et al.*, 1997; Daly, 1998). However, the emergence of the radicle usually ceased at this initial stage and germination stopped. Although Kondo *et al.* (1997) succeeded in introducing European *Aldrovanda* into in vitro cultivation, we conclude that this method is not sufficiently reliable. Instead, we recommend starting with young defoliated shoot segments and applying a mild surface sterilization.

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Book Review: Juvenile Literature

Reviewed by Barry Meyers-Rice

The majority of books published on carnivorous plants each year are intended for children. The editors of Carnivorous Plant Newsletter do not wish to clog the pages of this journal with reviews of all these little books (but see Carniv. Pl. Newslett. 28:3, p91), however it would be sensible to comment on at least a few of them.

Hungry Plants (Mary Batten, ISBN 0-307-26401-7, $3.99, paperback, 44 pp.) is a sweet little book for very young readers (expect about 40 words per page). Even though it is targeted at such a young audience, this book generally gets its facts straight. The artwork inside (no photographs) is colorful and interesting.

Plants of Prey (Densey Clyne, ISBN 0-8368-2060-6, hardcover $20 through Amazon.com, 32 pp.), not to be confused with Rika Erickson's book of the same name, is much larger than Hungry Plants in layout but has fewer pages. This book is a little more advanced than Batten's, and accurately introduces simple botanical concepts. The macrophotography profusely illustrating the text is very nice, and will fill imaginative kiddies with wonder.

Bloodthirsty Plants (Victor Gentle, ISBN 0-8368-1655-2 and others, hardcover $19 each through Amazon.com, 25pp each.) is actually the name for a series of six books on carnivorous plants and fungi. Bearing such interesting names as "Bladderworts: Trapdoors to Oblivion", "Butterworts: Greasy Cups of Death", "Pitcher Plants: Slippery Pits of No Escape", and "Sundews: A Sweet and Sticky Death", these booklets are in a small format (approximately 19 cm, or 7.5 inches, on each side, 25 pages each). Given to only an occasional error or mislabeled photograph, they are excellent introductions to each kind of carnivorous plant. The illustrations are good although not as fine as in Clyne's book. All the books in this series, as well as Clyne's book, are sturdily constructed with hard covers to give little tykes the feeling they are really reading books. They would also stand up to some abuse from being chewed and thrown about, I suppose.

In summary, I would not feel embarrassed about giving any of these books to my nephew when he gets old enough, but is not quite ready for Harry Potter. Hey, that is a good idea...

Sightings

ICPS president-elect David Gray spotted this new sign near Gasquet, California, during a recent botanical expedition. Rarely is it is this easy to find plants!

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Species/Hybrid Name	Native Area, Description Leaf Span Diameter in Inches	US $
Brocchinea reducta	Guyana Highlands, S.A. (5" tall pitchers)	30
Cephalotus follicularis	Australia (1.5" diameter) (3 plants)	10
Heliamphora ionasi	Ilu Tepui., Venezuela (1.5" pitchers)	45
H. minor	AuyanTepui, Venezuela (4" pitchers)	80
H. minor	Akopan Tepui, Venezuela, hairy, (4")	80
H. nutans	C. Kukenam, Venezuela (1.5" pitchers)	30
H. tatei	C. Huachamachari, Venezuela (2" pitchers)	55
N. alata	Palawan, Philippines (5" diameter)	20
N. alata	Philippines (dark red traps, 5" diamet.)	30
N. albo-marginata	Penang, Malaysia (green trap, 5" diam)	20
N. albo-marginata	Penang, Malaysia (all red variety, 5")	35
N. ampullaria	Sarawak, Malaysia (green, 5" diameter)	20
N. ampullaria	Sarawak, Malaysia (speckled, 5" diam.)	20
N. aristolochioides	Sumatra (>2" diameter)	50
N. bellii	Mindanao, Philippines (4" diameter)	35
N. bicalcarata	Brunei, Borneo (3' diameter)	20
N. bicalcarata	Borneo (>7" diameter)	30
N. bongso	Indonesia (4" diameter)	50
N. burbidgeae	G. Kinabalu, Sabah (4" diameter)	55
N. burkei	Philippines (>5" diameter)	25
N. caranculata	G. Sago, Sumatra (4" diameter)	25
N. clipeata	G. Kelam, Borneo (4" diameter)	60
N. danseri	Waigeo Island, Irian Jaya (5" diameter)	40
N. deaniana	Palawan (>3" diameter)	50
N. distillatoria	Sri Lanka (yellow/green, >3" diam.)	10
N. distillatoria	Sri Lanka (pink, >3" diameter)	15
N. distillatoria	Sri Lanka (purple, >3" diameter)	30
N. ephippiata	G. Raya, Borneo (4" diameter)	40
N. eustachya	K. Sembilan, Sumatra (4" diameter)	40
N. eymae	G. Lumut, Sulawesi, Indonesia (3")	50
N. faizaliana	Borneo (2" diameter)	35
N. fusca	Sabah (>4" diameter)	15
N. gracilis	Talangka Rajah, Borneo (3" diameter)	15
N. gracillima	Genting Highlands, Malaysia (4" diam.)	35
N. gymnamphora	G. Singgalang, Sumatra (4" diameter)	30
N. hirsuta	Sarawak, Malaysia (3" diameter)	25
N. hispida	Malaysia (>6" diameter)	40
N. insignis	E. Biak, Indonesia (4" diameter)	45
N. khasiana	Meghalaya, India (4" diameter)	15
N. lamii	Irian Jaya (3" diameter)	50
N. lowii	Brunei (3" diameter)	45
N. lowii	G. Mulu, Sarawak (3" diameter)	40
N. lowii	G. Trusmadi, Sabah (3" diameter)	40
N. lowii	G. Murud, 6400 ft (2" diameter)	40
N. lowii	G. Kinabalu, Sabah (2" diameter)	50
N. macfarlanei	Genting Highlands, Malaysia (4" diam.)	25
N. macrophylla	G. Trusmadi, Borneo (2" diameter)	80
N. madagascariensis	Madagascar (2" leaves, >4" diameter)	15
N. maesolensis	Madagascar (2" diameter)	30
N. maxima	Rantepao, Sulawesi (4" diameter)	30
N. maxima	Celebes (> 4" diameter)	30
N. maxima	Anggi Lakes, Irian Jaya (4" diameter)	35
N. maxima	G. Cobray, 7260 ft. elevation (3" diam.)	40
N. maxima	Indonesia (>5" diameter)	35
N. merrilliana	Mindanao, Philippines (3" diameter)	30
N. mirabilis	Cape York, Australia (4" diameter)	15
N. mirabilis	Brunei (Echinostoma, 3" diameter)	30
N. mirabilis	Macau, China (5" diameter)	15
N. muluensis	G. Mulu, Sarawak (>4" diameter)	40
N. murudensis	G. Murud, 7000 ft. (3" diameter)	35
N. neogunieensis	Angkasa, Irian Jaya (5" diameter)	60
N. northiana	Bau, Sarawak (>5" diameter)	30
N. pervillei	Seychelles (4" diameter)	40
N. pilosa	G. Batu Buli, Sarawak (2" diameter)	30
N. rafflesiana	Bau, Sarawak (giant form, 5" diameter)	30
N. rafflesiana	Brunei (typical, 5" diameter)	15
N. rafflesiana	Brunei (elongata, 3" diameter)	30
N. rafflesiana	Brunei (gigantea, 3" diameter)	30
N. rajah	G. Kinabalu, Sabah (2" diameter)	25
N. reinwardtiana	Borneo (green trap, 4" diameter)	20
N. reinwardtiana	Telupid, Sarawak (red trap, 3" diam.)	30
N. reinwardtiana	G. Murud, 6900 ft. (2" diameter)	35
N. sanguinea	Genting Highlands, Malaysia (4" diam.)	20
N. sibuyanensis	Sibuyan, Philippines (4" diameter)	30
N. spathulata	Sumatra (>4" diameter)	40
N. stenophylla	Sarawak (>4" diameter)	45
N. sumatrana	Sibolga, Sumatra (4" diameter)	30
N. talangensis	G. Talang, Sumatra (4" diameter	35
N. tentaculata	G. Murud (3" diameter)	30
N. thorelli	Phuk Radung, E. Thailand (5" diameter)	20
N. tobaica	Sumatra (red pitcher) (4" diameter)	35
N. treubiana	Sibolga, Sumatra (5" diameter)	35
N. truncata	Philippines (>7"diameter)	35
N. veitchii (highland)	Batu Lawi, Sarawak (4" diameter)	25
N. veitchii (lowland)	Sungai Samba, Borneo (4" diameter)	25
N. ventricosa	Philippines (3" leaves, 5" diameter)	10
N. ventricosa	Philippines (green traps with dark red peristome, very unusual, 6" diameter)	35
N. vieillardii	New Caledonia (3" diameter)	25
N. villosa	G. Kinabalu, Sabah (2" diameter)	50
Selected Hybrids		
N. bicalcarata x ampullaria	Sipitang, Sabah (very vigorous with dark red/green leaves, 5" diameter)	30
N. fusca x burbidgeae	(5" diameter)	35
N. x hookeriana	Brunei, Borneo (5" diameter)	30
N. khasiana x truncata	(5" diameter)	20
N. sanguinea x truncata	(4" diameter)	30
N. spathulata x veitchii	(4" diameter)	30
N. truncata x maxima	(5" diameter)	30
N. truncata x ventricosa	(5" diameter)	30
N. veitchii x lowii	(5" diameter)	30
N. ventricosa x inermis	(6" diameter)	20
Victorian Hybrids	Spectacular Traps (>6" diameter)	
N. x coccinea	London, Late 1800's	20
N. x dyeriana	London, Late 1800's	50
N. x mixta	London, Late 1800's	35
N. x wrigleyana	London, Late 1800's	20

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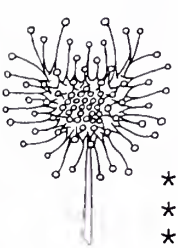

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